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EXAMINER	
HO, THANG H	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/080,063	SMITH, HUBBERT	
	Examiner	Art Unit	
	Thang H Ho	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Appeal Brief filed September 23, 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's Appeal Brief filed September 23, 2004.

2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

3. Claims 1-43 are pending in the application.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ofek (United States Patent 5,901,327).

As per claim 1, Ofek discloses in FIG. 1 an adapter to be used in a first server (SITE A) comprising: a controller (16) including circuitry to cause, in response to a first request received by the controller, execution of a first data storage-related operation associated with a first set of mass storage devices (20) and to issue, also in response to the first request, a second request from the controller to a second adapter (controller 44) in a second server (REMOTE SITE B) in the network to cause the second controller to perform, in response to the second request, a second data storage-related operation

associated with a second set of mass storage devices (48) (e.g. column 12, lines 49-55 " *when the first set of mass data storage devices (20) has valid data in cache... a link adapter transfers data... to the cache in the data storage system housing the secondary (R2) volume...* " and FIGS. 7-8, column 16, lines 22-37). Additionally, Ofek teaches the transferring of data between host and the mass storage devices over data signal paths. However, Ofek fails to teach the utilization of a host bus adapter (HBA). Nonetheless, it would have been obvious for one of ordinary skill in the art to implement a HBA comprising the controller as taught by Ofek for direct connecting the mass storage devices and the host. One skilled in the art would have been motivated to do so, because it eliminates the need for transfer data over a signal path, thereby providing faster and more reliable data transfer.

As per claim 2, Ofek discloses the adapter further comprising: additional circuitry to issue, in response to a first message from the second adapter (44), a second message to a process in the first server (host A), the first message indicating that the second data storage-related operation has been completed, the second message indicating that a respective data storage-related operation requested by the first request has been completed (e.g. column 13, lines 1-21 *"system containing the secondary (R2) volume acknowledges... the data storage system containing the primary (R1) volume sends DE to the host and the host considers the input/output complete...* ").

As per claims 3 and 7, Ofek discloses that the second request and the first

message each comprise a respective target node address field, initiating node address field, command field, and message identification field; and respective message identification fields in the second request and the first message contain identical respective values (e.g. column 44, lines 21-35).

As per claim 4, Ofek discloses that the first and the second adapters each comprise a respective I/O processor (e.g. FIG. 1, elements 16 and 44).

As per claim 5, Ofek discloses an adapter (16) to be used in a first server (host A), the first adapter (16) comprising: a host bust adapter (HBA) including circuitry to perform, in response to a request, a data storage-related operation associated with a first set of mass storage devices (20), the request being issued from a second adapter (44) in a second server (host B) in response to another request received by the second adapter (44) to cause the second adapter (44) to perform, in response to the another request, another data storage-related operation associated with a second set of mass storage devices (48) (e.g. column 12, lines 49-55).

As per claim 6, Ofek discloses the adapter further comprising: additional circuitry to issue a first message to the second adapter (44) to indicate that the data storage-related operation associated with the first set of mass storage devices (20) has been completed, and the second adapter (44) is configured to issue, in response to the first message, a second message to a process in the second server (host B) (e.g. column

13, lines 1-21 *"system containing the secondary (R2) volume acknowledges... the data storage system containing the primary (R1) volume sends DE to the host and the host considers the input/output complete... "*).

As per claims 8-9, Ofek discloses that the first adapter (14) is coupled to the first set of mass storage devices (20); the second adapter (44) comprises a second host bus adapter (54 and 66) coupled to the second set of mass storage devices (48); and the first adapter (14) and the second adapter (44) are coupled together via a network communication link (40).

As per claim 10, Ofek discloses in FIG. 1 a first input/output (I/O) processor (16), the first I/O processor (16) being comprised in a host bus adapter (HBA) in a first server and being configured so as to able to execute a set of operations comprising: execution, in response to a first request, of a first data storage-related operation associated with a first set of mass storage devices (20); issuance, also in response to the first request, of a second request from the first server to a second I/O processor (44) in a second server (host B) to cause the second I/O processor (44) to perform, in response to the second request, a second data storage-related operation associated with a second set of mass storage devices (48) (e.g. column 12, lines 49-55 *" when the first set of mass data storage devices (20) has valid data in cache... a link adapter transfers data... to the cache in the data storage system housing the secondary (R2) volume... "* and FIGS. 7-8,

column 16, lines 22-37).

As per claim 11, Ofek further discloses that the first server (host A) comprises the first I/O processor (16) and the first set of mass storage devices (20); the second server (host B) comprises the second set of mass storage devices (48); and the first and second servers are coupled together via a network communication link (40).

As per claim 12, Ofek discloses that the second data storage-related operation comprises one or more of the following operations: designation of a first data volume in a second server (host B) in which data stored in a second data volume in the first server (host A) is to be replicated; and replication in the first data volume of the data (e.g. column 12, lines 6-40).

As per claim 13, Ofek discloses that the second data storage-related operation comprises one or more of the following operations: termination of a previously-established association between a first data volume in the second network node and a second data volume in the first network node, the association designating that data stored in the second data volume is to be replicated in the first data volume; and re-establishment of the previously-established association after the previously-established association has been terminated (e.g. column 13, lines 15-21).

As per claim 14, Ofek discloses that the first I/O processor (16) being comprised in a host bus adapter (HBA) in a first server and being configured to execute a set of operations comprising: execution, in response to a request, of a first data storage-related operation associated with a first set of mass storage devices (20); and issuance, after completion of the execution of the first data storage-related operation, of a first message from a first server (host A) to a second I/O processor (44) in a second server (host B) to cause the second I/O processor (44) to issue, in response to the first message, a second message to a process in the second server (host B), the second I/O processor (44) being operatively configurable both to generate the request and to perform a second data storage-related operation associated with a second set of mass storage devices, in response to another request from the process (e.g. column 12, lines 49-55 *" when the first set of mass data storage devices (20) has valid data in cache... a link adapter transfers data... to the cache in the data storage system housing the secondary (R2) volume..."* and FIGS. 7-8, column 16, lines 22-37).

As per claim 15, Ofek discloses that the first set of mass storage devices (20) comprises one or more respective mass storage devices; the second set of mass storage devices (48) comprises one or more respective mass storage devices; and the first message is comprised in a frame (e.g. FIG. 4, elements 223a-d, FIG. 1, element 40 and column 44, lines 21-35).

As per claims 16-30, the claims encompass the same scope of invention as to that of claims 1-15, respectively, however the claims are drafted as method format rather than apparatus format, the claims are therefore rejected for the same reasons as being set forth above.

As per claim 31, Ofek discloses in FIG. 1 a network comprising: a first server (host A) associated with a first set of mass storage devices (20) and including a first input/output (I/O) processor (16); a second server (host B) remote from the first network node, associated with a second set of mass storage devices (48), and including a second I/O processor (44); a network communication link (40) coupling the first server (host A) to the second server (host B); the first I/O processor (16) being comprised in a host bus adapter (HBA) in a first server and being configured so as to be able to cause the following operations: execution, in response to a first request, of a first data storage-related operation associated with the first set of mass storage devices (20); issuance, also in response to the first request, of a second request from the first server (host A) to the second server (host B) via the link (40) to cause the second I/O processor (44) to perform, in response to the second request, a second data storage-related operation associated with the second set of mass storage devices (48) (e.g. column 12, lines 49-55 *" when the first set of mass data storage devices (20) has valid data in cache... a link adapter transfers data... to the cache in the data storage system housing the secondary (R2) volume..."* and FIGS. 7-8, column 16, lines 22-37).

As per claim 32, Ofek discloses that the second I/O processor (46) is configured so as to be able to cause the following operations to be executed: execution, in response to the second request, of the second data storage-related operation; and issuance, after completion of the execution of the second data storage-related operation, of a first message from the second server (host B) to the first server (host A) via the link (40) to cause the first I/O processor (16) to issue a second message to a process in the first server (host A) to indicate a completion of the first data storage-related operation and the second data storage-related operation (e.g. column 13, lines 1-5 *"...the secondary (R2) volume acknowledges... the primary (R1) volume sends De to the host... considers the input/output complete and starts the next input/output operation."*).

As per claim 39, Ofek discloses in FIG. 1 a first server (host A), comprising: a host bus adapter (HBA) comprising a first processor (16); the first processor being configured to be able to cause: execution, in response to a first request, of a first data storage-related operation associated with a first set of storage devices (20), the first set of storage devices (20) being associated with the first server (host A); and issuance, also in response to the first request, of a second request from the first server (host A) to a second server (host B) to cause a second processor (44) in the second server (host B) to perform, in response to the second request, a second data storage-related operation associated with a second set of storage devices (48), the second set of storage devices (48) being associated with the second server (host B) (e.g. column 12, lines 49-55 *" when the first set of mass data storage devices (20) has valid data in cache... a link adapter transfers*

data... to the cache in the data storage system housing the secondary (R2) volume..." and FIGS. 7-8, column 16, lines 22-37).

As per claim 40, Ofek discloses that the set of storage devices comprises a set of one or more mass storage devices (e.g. FIG. 4, elements 223a-d).

As per claim 41, Ofek discloses in FIG. 1 that the second server (host B) is remote from the first server (host A).

As per claim 42, Ofek discloses in FIG. 1 a first server (host A), comprising: a host bus adapter (HBA) comprising a first processor (16); the first processor being configured to be able to cause the following operations to be executed: execution, in response to a request, of a first data storage-related operation associated with a first set of storage devices (20); and issuance, after completion of the execution of the first data storage-related operation, of a first message from the first server (host A) to a second processor (44) in a second server (host B) to cause the second processor (44) to issue, in response to the first message, a second message to a process in the second server (host B), the second processor (44) being operatively configurable both to generate the request and to perform a second data storage-related operation associated with a second set of storage devices (48), in response to another request from the process.

As per claim 43, Ofek further discloses that the first set of storage devices (20) comprises one or more mass storage devices; the second set of storage devices (48) comprises one or more mass storage devices; and the first message is comprised in a frame (e.g. FIG. 4, elements 223a-d, FIG. 1, element 40 and column 44, lines 21-35).

As per claims 33-38, Ofek discloses the invention as claimed, detailed above with respect to claims 1-32 and 39-43. Ofek however does not particularly disclose a computer-readable medium of instructions to be implemented on a client computer as being claimed in claims 1-32 and 39-43. However, one of ordinary skill in the art would have recognized that computer readable medium (i.e., floppy, CD-ROM, etc.) carrying computer-executable instructions for implementing a method, because it would facilitate the transporting and installing of the method on other systems, is generally well-known in the art. For example, a copy of the Microsoft Windows operating system can be found on a CD-ROM from which Windows can be installed onto other systems, which is a lot easier that running a long cable or hand typing the software onto another system. It would have been obvious to put Ofek's program on a computer readable medium, because it would facilitate the transporting, installing and implementing of Ofek's program on other systems.

Response to Arguments

6. Applicant's arguments with respect to claims 1-43 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thang H Ho whose telephone number is 571-272-4206. The examiner can normally be reached on Monday-Friday from 7:00 A.M. - 3:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mano Padmanabhan 1/5/05

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER

Thang Ho
Art Unit 2188
January 4, 2005